

PATENT  
Attorney Docket No. 231461  
Client Reference No. E-262-2000/1-US-03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Burke et al.

U.S. National Phase of PCT/US2003/019987

Group Art Unit: Unassigned

Filed: Herewith

Examiner: Unassigned

For: SH2 DOMAIN BINDING INHIBITORS

**INFORMATION DISCLOSURE STATEMENT**

Mail Stop PCT  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Pursuant to 37 CFR 1.97 and 1.98, the references listed on the enclosed Form PTO-1449 and/or Substitute Form PTO-1449 ("Form 1449") are submitted for consideration by the Examiner in the examination of the above-identified patent application.

The full consideration of the references in their entirety by the Examiner is respectfully requested and encouraged. Also, it is respectfully requested that the references be entered into the record of the present application and that the Examiner place his or her initials in the appropriate area on the enclosed Form 1449, thereby indicating the Examiner's consideration of each of the references.

The submission of the references listed on the Form 1449 is for the purpose of providing a complete record and is not a concession that the references listed thereon are prior art to the invention claimed in the patent application. The right is expressly reserved to establish an invention date earlier than the above-identified filing date in order to remove any reference submitted herewith as prior art should it be deemed appropriate to do so.

Further, the submission of the references is not to be taken as a concession that any reference represents art that is relevant or analogous to the claimed invention. Accordingly, the right to argue that any reference is not properly within the scope of prior art relevant to an examination of the claims in the above-identified application is also expressly reserved.

The Information Disclosure Statement is being filed:

**within** any one of the following time periods: (a) within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d); (b) within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 of an international application; (c) before the mailing date of a first Office Action on the merits; or (d) before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114.

- after (a), (b), (c) or (d) above, but before the mailing date of a final action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an action that otherwise closes prosecution in the application, and includes *one* of:
  - the Statement under 37 CFR 1.97(e) (see "Statement under 37 CFR 1.97(e)" below).
  - or*
  - the fee of \$180 set forth in 37 CFR 1.17(p) (see "Fees" below).
- after the mailing date of a final action under 37 CFR 1.113 or a Notice of Allowance under 37 CFR 1.311, or an action that otherwise closes prosecution in the application, and on or before payment of the issue fee, and includes the Statement under 37 CFR 1.97(e) (see "Statement under 37 CFR 1.97(e)" below), and the fee of \$180 as set forth in 37 CFR 1.17(p) (see "Fees" below).
- after the mailing date of a Notice of Allowance under 37 CFR 1.311, and on or before payment of the issue fee, and **within** thirty days of receiving each item of information contained in the Information Disclosure Statement, and includes the Statement under 37 CFR 1.704(d) (see "Statement under 37 CFR 1.704(d)" below), and the fee of \$180 as set forth in 37 CFR 1.17(p) (see "Fees" below).

NOTE: This is for original applications except applications for a design patent, filed on or after May 29, 2000, wherein a paper containing only an Information Disclosure Statement in compliance with 37 CFR 1.97 and 1.98 is being filed.

#### Copies of the References

- Copies of all of the references listed on the enclosed Form 1449 are enclosed herewith.
- Copies of U.S. patents A179-A194 that are listed on the accompanying Form 1449 are not enclosed herewith.
- Attached to each reference not in the English language is a concise explanation of the relevance pursuant to 37 CFR 1.98(a)(3). An English-language equivalent/patent, or an English-language abstract, or an English-language version of the search report or action by a foreign patent office in a counterpart foreign application indicating the degree of relevance found by the foreign office is being submitted in lieu of a concise explanation of the relevance pursuant to 37 CFR 1.98(a)(3).
- A copy of the foreign search report is enclosed herewith.
- References A1-A178 and A195-A197 listed on the enclosed Form 1449 were previously identified in the parent application(s) of the present application, and copies of the references were furnished at that time. Accordingly, additional copies of the references are not submitted herewith, so as not to burden the file with duplicate copies of references. The Examiner is respectfully requested to carefully review the references in accordance with the requirements set out in the Manual of Patent

Examining Procedure. In accordance with 37 CFR 1.98(d), the details of the parent application(s) relied upon for an earlier filing date under 35 USC 120 in which copies of the references were previously furnished are set out below:

U.S. APPLICATIONS		Status (check one)		
U.S. APPLICATIONS	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
1. 10/362,231	February 21, 2003		X	
2.				
3.				

**Statement under 37 CFR 1.97(e)**

- The **undersigned** hereby states that each item of information contained in the Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign patent application not more than three months prior to the filing of the Information Disclosure Statement.
- The **undersigned** hereby states that no item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign patent application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the Information Disclosure Statement.

**Statement under 37 CFR 1.704(d)**

- The **undersigned** hereby states that each item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart application and that this communication was not received by any individual designated in 37 CFR 1.56(c) more than thirty days prior to the filing of the Information Disclosure Statement.

**Fees**

- No fee is owed by the applicant(s).
- The IDS Fee of \$180 under 37 CFR 1.17(p) is enclosed herewith.

**Method of Payment of Fees**

- Attached is a check in the amount of \$ .
- Charge Deposit Account No. 12-1216 in the amount of \$ . (A duplicate copy of this communication is enclosed for that purpose.)

10/517717

In re Appln. of Burke [REDACTED]  
Attorney Docket No. 231461

DTO [REDACTED] c'd PCT/PTO 10 DEC 2004

**Authorization to Charge Additional Fees**

If any additional fees are owed in connection with this communication, please charge Deposit Account No. 12-1216. (A duplicate copy of this communication is enclosed for that purpose.)

**Instructions as to Overpayment**

Credit Account No. 12-1216.  
 Refund



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Date: December 10, 2004

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Substitute for form 1449A/B/PTO

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

*Complete if Known*

				Application Number	
				Filing Date	Herewith
				First Named Inventor	Terrence R. Burke, Jr.
				Group Art Unit	
				Examiner Name	Unassigned
Sheet	1	of	11	Attorney Docket Number	231461

## U.S. PATENT DOCUMENTS

Examiner Initials	Doc. No.	U.S. Patent Document		Name of Patentee or Applicant	Date of Publication	Filing Date If Appropriate
		Application or Patent Number	Kind Code			
	A 1	3,906,031		Carpino et al.	9/16/1975	
	A 2	4,394,519		Carpino et al.	7/19/1983	
	A 3	4,879,398		Getman et al.	11/7/1989	
	A 4	5,182,263		Danho et al.	1/26/1993	
	A 5	5,200,546		Burke, Jr. et al.	4/6/1993	
	A 6	5,272,268		Toyoda et al.	12/21/1993	
	A 7	5,296,608		Danho et al.	3/22/1994	
	A 8	5,369,110		Schmidlin et al.	11/29/1994	
	A 9	5,457,114		Stüber et al.	10/10/1995	
	A 10	5,463,062		Hemmerle et al.	10/31/1995	
	A 11	5,491,253		Stuk et al.	2/13/1996	
	A 12	5,508,437		Danho et al.	4/16/1996	
	A 13	5,525,733		Novack et al.	6/11/1996	
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	A 15	5,580,979		Bachovchin	12/3/1996	
	A 16	5,587,372		Aszodi et al.	12/24/1996	
	A 17	5,616,776		Stuk et al.	4/1/1997	
	A 18	5,627,283		Stüber et al.	5/6/1997	
	A 19	5,646,036		Schwall et al.	7/8/1997	
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	A 21	5,686,292		Schwall et al.	11/11/1997	
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	A 23	5,698,731		Bosetti et al.	12/16/1997	
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	A 32	5,786,454		Waksman et al.	7/28/1998	
	A 33	5,789,427		Chen et al.	8/4/1998	
	A 34	5,792,771		App et al.	8/11/1998	
	A 35	5,792,783		Tang et al.	8/11/1998	
	A 36	5,834,504		Tang et al.	11/10/1998	
	A 37	5,843,997		Heinz et al.	12/1/1998	
	A 38	5,849,693		Wells et al.	12/15/1998	
	A 39	5,849,742		App et al.	12/15/1998	
	A 40	5,880,141		Tang et al.	3/9/1999	

Examiner Signature		Date Considered	
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\* A concise statement of relevance is being submitted in lieu of a translation. 37 CFR 1.98(a)(3).

+ An English-language equivalent/patent, or an English-language abstract, or an English-language version of the search report or action by a foreign patent office in a counterpart foreign application indicating the degree of relevance found by the foreign office is being submitted in lieu of a concise explanation of relevance under 37 CFR 1.98(a)(3).

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Substitute for form 1449A/B/PTO				<i>Complete if Known</i>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>				Application Number	
				Filing Date	Herewith
				First Named Inventor	Terrence R. Burke, Jr.
				Group Art Unit	
				Examiner Name	Unassigned
Sheet	2	of	11	Attorney Docket Number	231461

## **U.S. PATENT DOCUMENTS**

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Sheet	3	of	11	Attorney Docket Number	231461

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		Application or Patent Number	Kind Code			

FOREIGN PATENT DOCUMENTS							
Examiner Initials	Doc. No.	Foreign Patent Document			Name of Patentee or Applicant	Date of Publication	Translation
		Office	Application or Patent Number	Kind Code			Yes No*+
	A 56	PCT	WO 94/07913		Dobrusin et al.	04/14/94	
	A 57	PCT	WO 95/11917		Bolton et al.	05/04/95	
	A 58	PCT	WO 96/23813		Patel et al.	08/08/96	
	A 59	PCT	WO 97/08193		Garcia-Echeverria et al.	03/06/97	
	A 60	PCT	WO 00/73326		Roller et al.	12/07/00	

OTHER - NON PATENT LITERATURE DOCUMENTS							
Examiner Initials		Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number (s), publisher, city and/or country where published.					Translation
		Yes	No*+				
	A 61	Ye et al., "L-O-(2-Malonyl)tyrosine" A New Phosphotyrosyl Mimetic for the Preparation of Src Homology 2 Domain Inhibitory Peptides", J. Med. Chem. Vol. 38, pp. 4270-4275, 1995					
	A 62	Burke, Jr., et al., "4'-O-[2-(2-Fluoromallyl)]-L-tyrosine: A Phosphotyrosyl Mimic for the Preparation of Signal Transduction Inhibitory Peptides", J. Med. Chem., Vol. 39, pp 1021-1027, March 1, 1996					
	A 63	Schoepfer et al., "Structure-based Design of Peptidomimetic Ligands of Grb2-SH2 Domain", Bioorganic & Medicinal Chemistry Letters 8, pp. 2865-2870, 1998					
	A 64	Yao et al., "Potent Inhibition of Grb2 SH2 Domain Binding by Non-Phosphate-Containing Ligands", J. Med. Chem., Vol. 42, pp. 25-35, 1999					
	A 65	Gay et al., "Effect of Potent and Selective Inhibitors of the Grb2 SH2 Domain on Cell Motility", The Journal of Biological Chemistry, Vol. 274, pp. 23311-23315, August 13, 1999					
	A 66	Schoepfer et al., "Highly Potent Inhibitors of the Grb2-SH2 Domain", Bioorganic & Medicinal Chemistry Letters 9, pp. 221-226, 1999					
	A 67	Burke, Jr., et al., Monocarboxylic-Based Phosphotyrosyl Mimetcs in the Design of Grb2 SH2 Domain Inhibitors", Bioorganic & Medicinal Chemistry Letters 9, pp. 347-352, 1999					
	A 68	Gilmer et al., "Peptide Inhibitors of src SH3-SH2-Phosphoprotein Interactions", The Journal of Biological Chemistry, Vol. 269, pp. 31711-31719, December 16, 1994					
	A 69	Charifson et al., "Peptide Ligands of pp60 <sup>c-src</sup> SH2 Domains: A Thermodynamic and Structural Study", Biochemistry, Vol. 36, pp. 6283-6293, 1997					
	A 70	Liu et al., "Synthesis of L-2,3,5,6-Tetrafluoro-4-(Phosphonomethyl) Phenylalanine, a Novel Non-Hydrolyzable Phosphotyrosine Mimetic and L-4-(Phosphonodifluoromethyl)Phenylalanine", Tetrahedron Letters, Vol. 38, pp. 1389-1392, 1997					

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Substitute for form 1449A/B/PTO <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i> Sheet 4 of 11				<b>Complete if Known</b>	
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				First Named Inventor	Terrence R. Burke, Jr.
				Group Art Unit	
Examiner Name	Unassigned				
				Attorney Docket Number	231461

**OTHER - NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Doc. No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number (s), publisher, city and/or country where published.	Translation	
			Yes	No**
	A 7 1	Cleland, "The Meerwein Reaction in Amino Acid Synthesis. II. An Investigation of Twenty-one Substituted Anilines", The Journal of Organic Chemistry, Vo., 34, pp. 744-747, March 1969		
	A 7 2	Gao et al., "Inhibition of Grb2 SH2 Domain Binding by Non-Phosphate-Containing Ligands. 2. 4-(2-Malonyl)phenylalanine as a Potent Phosphotyrosyl Mimetic, J. Med. Chem., Vol. 43, pp. 911-920, 2000		
	A 7 3	Furet et al., "Structure-Based Design and Synthesis of High Affinity Tripeptide Ligands of the Grb2-SH2 Domain, J. Med. Chem., Vol. 41, pp. 3442-3449, 1998		
	A 7 4	Tong et al., "Carboxymethyl-phenylalanine as a Replacement for Phosphotyrosine in SH2 Domain Binding", The Journal of Biological Chemistry, Vol. 273, pp. 20238-20242 August 7, 1998		
	A 7 5	Kim et al., FEBS Lett, 453, 174-178, 1999		
	A 7 6	Tulasne et al., "The Multisubstrate Docking Site of the MET Receptor is Dispensable for MET-mediated RAS Signaling and Cell Scattering", Molecular Biology of the Cell, Vol. 10, pp.551-565, March 1999		
	A 7 7	Kim et al., "Dual Signaling Role of the Protein Tyrosine Phosphatase SHP-2 in Regulating Expression of Acute-Phase Plasma Proteins by Interleukin-6 Cytokine Receptors in Hepatic Cells", Molecular and Cellular Biology, Vol. 19, pp. 5326-5338, Aug. 1999		
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	A 7 9	Maina et al., "Uncoupling of Grb2 from the Met Receptor in Vivo Reveals Complex roles in Muscle Development", Cell, Vol. 87, pp. 531-542, Nov. 1, 1996		
	A 8 0	Ponzetto et al., "Specific Uncoupling of GRB2 from the Met Receptor", The Journal of Biological Chemistry, Vol. 271, pp. 14119-14123, June 14, 1996		
	A 8 1	Ettmayer et al., "Structural and Conformational Requirements for High-Affinity Binding to the SH2 Domain of Grb2", J. Med. Chem., Vol. 42, pp. 971-980, 1999		
	A 8 2	Royal et al., "Differential Requirement of Grb2 and P13-Kinase in HGF/SF-Induced Cell Motility and Tubulogenesis", Journal of Cellular Physiology, Vol. 173, pp. 196-201, 1997		
	A 8 3	Gao et al., Biorg & Med Chem Lett, 10, 923-927 (2000)		
	A 8 4	Burke, Jr., et al., "Preparation of...Peptide Synthesis", J. of Synthetic Organic Chem., No. 11, p. 1019, Nov. 11, 1991.		

Examiner Signature		Date Considered	
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Sheet	5	of	11	Attorney Docket Number	231461

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			Yes      No**
	A 8 5	Burke, Jr., et al., "Potent Inhibition of Grb2 SH2 domain Binding by Non-Phosphate containing Ligands", First Annual Meeting on the Experimental Therapeutics of Human Cancer, June 11-13, 1998, Hood College, Frederick Maryland (Summary)	
	A 8 6	Katunuma et al., "Use of new synthetic substrates for assays of cathepsin L and cathepsin B", J. Biochem. (Tokyo), Vol. 93, pp. 1129-35, 1983 (Abstract only)	
	A 8 7	Burke, Jr., et al., "Enantioselective Synthesis...Inhibitory Peptides", Tetrahedron, Vol. 54, pp. 9981-9994, 1998	
	A 8 8	Burke, Jr., et al., "Phosphotyrosyl-Based Motifs in the Structure-Based Design of Protein-Tyrosine Kinase-Dependent Signal Transduction Inhibitors", Current Pharmaceutical Design, Vol. 3, pp. 291-304, 1997	
	A 8 9	Burke, Jr., et al., "Nonhydrolyzable Phosphotyrosyl Mimetics for the Preparation of Phosphatase-Resistant SH2 Domain Inhibitors", Biochemistry, Vol. 33, pp. 6490-6494, 1994	
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	A 9 1	Kuriyan, "Modular Peptide recognition Domains in Eukaryotic Signaling", Annu. Rev. Biophys. Biomol. Struct., Vol. 26, pp. 259-88, 1997	
	A 9 2	Mayer et al., "Functions of SH2 AND SH3 Domains", Protein modules in signal transduction, edited by A. J. Pawson, Berlin, New York, Springer, c1998, pp. 1-22	
	A 9 3	Fry et al., "New insights into protein-tyrosine kinase receptor signaling complexes", Protein Science, Vol. 2, pp. 1785-1797, 1993	
	A 9 4	Levitzki, "Targeting signal transduction for disease therapy", Current Opinion in Cell Biology, Vol. 8, pp. 239-244, 1996	
	A 9 5	Boutin, "Tyrosine Protein Kinase Inhibition and Cancer", Int. J. Biochem., Vol. 26, pp. 1203-1226, 1994	
	A 9 6	Levitzki et al., "Tyrosine Kinase Inhibition: An Approach to Drug Development", Science, Vol. 267, pp. 1782-1788, March 24, 1995	
	A 9 7	Lawrence et al., "Protein Kinase Inhibitors: The Tyrosine-specific Protein Kinases", Pharmacol. Ther., Vol. 77, pp. 81-114, 1998	
	A 9 8	Burke, Jr., et al., "Protein-Tyrosine Phosphatases: Structure, Mechanism, and Inhibitor Discovery", Biopolymers (Peptide Science), Vol., 47, pp. 225-241 (1998)	
	A 9 9	Schoelson, "SH2 and PTB domain interactions in tyrosine kinase signal transduction", Current Opinion in Chemical Biology, Vol. 1, pp. 227-234, 1997	

Examiner Signature		Date Considered	
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				First Named Inventor	Terrence R. Burke, Jr.
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Sheet	6	of	11	Attorney Docket Number	231461

**OTHER - NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Doc. No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number (s), publisher, city and/or country where published.	Translation Yes      No**
	A 100	Waksman et al., "Crystal structure of the phosphotyrosine recognition domain Sh2 of v-src complexed with tyrosine-phosphorylated peptides", Nature, Vol. 358, pp. 646-653, Aug. 20, 1992	
	A 101	Waksman et al., "Binding of High Affinity Phosphotyrosyl Peptide to the Src SH2 Domain: Crystal Structures of the Complexed and Peptide-free Forms", Cell, Vol. 72, pp. 779-790, March 12, 1993	
	A 102	Mikol et al., "The Crystal Structures of the SH2 Domain of p56 <sup>ck</sup> Complexed with Two Phosphopeptides Suggest a Gated Peptide Binding Site", J. Mol. Biol. Vol. 246, pp. 344-355, 1995	
	A 103	Hatada et al., "Molecular basis for interaction of the protein tyrosine kinase ZAP-70 with the T-cell receptor", Nature, Vol. 377, pp. 32-38, Sept. 7, 1995	
	A 104	Zhou et al., "Solution structure of the Shc SH2 domain complexed with a tyrosine-phosphorylated peptide from the T-cell receptor", Proc. Natl. Acad. Sci., Vol. 92, pp. 7784-7788, August 1995	
	A 105	Narula et al., "Solution structure of the C-terminal SH2 domain of the human tyrosine kinase Syk complexed with a phosphotyrosine pentapeptide", Structure, Vol. 3, 1061-1073, Oct. 15, 1995	
	A 106	Xu et al., "Solution Structure of the Human pp60 <sup>c-src</sup> SH2 Domain Complexed with a Phosphorylated Tyrosine Pentapeptide", Biochemistry, Vol. 34, pp. 2107-2121, 1995	
	A 107	Tong et al., "Crystal Structures of the Human p56 <sup>ck</sup> SH2 Domain in Complex with Two Short Phosphotyrosyl Peptides at 1.0 Å and 1.8 Å Resolution", Academic Press Limited, 10 pages, 1996.	
	A 108	Sicheri et al., "Crystal structure of the Src family tyrosine kinase Hck", Nature, Vol. 385, pp. 602-609, Feb. 13, 1997	
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				First Named Inventor	Terrence R. Burke, Jr.
				Group Art Unit	
Examiner Name	Unassigned				
Sheet	7	of	11	Attorney Docket Number	231461

**OTHER - NON PATENT LITERATURE DOCUMENTS**

Examiner Initials	Doc. No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number (s), publisher, city and/or country where published.	Translation
			Yes      No <sup>++</sup>
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		Application or Patent Number	Kind Code			
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A 172	PCT	WO 00/56760			Burke, Jr. et al.	9/28/00

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